REMARKS

Claims 1-35 are pending in the application and stand rejected under Section 102(b) or 103(a). In view of any amendments presented above and the remarks presented below, applicant's request reconsideration of the rejection of the claims and reexamination of the application.

Claims 1-6, 8-19 and 27-35 are Patentable over WO 99/60397.

Claims 1-6, 8-19 and 27-35 are rejected under 102(b) over WO 99/60397. The rejection is global respectfully traversed.

The citation WO 99/60397 fails to anticipate any of the subject claims. With respect to claim 1 and its dependent claims, the '397 citation fails to disclosed a microfluidic substrate assembly comprising a multi-layer laminated substrate defining at least one fluid inlet port and at least one microscale fluid flow channel within the multi-layer substrate in fluid communication with the inlet port for transport of fluid; and at least one operative component mounted aboard the multi-layer laminated substrate in communication with the microscale fluid flow channel. Accordingly, the rejection of claim 1 and claims depending from claim 1 over the '397 citation is in error and should be withdrawn.

In particular, in addition to other deficiencies, the '397 citation fails to anticipate claim 1 or claims dependent from claim 1 because it fails to disclose a microfluidic substrate assembly having at least 1 operative component mounted aboard a multi-layer laminated substrate in fluid communication with a microscale fluid flow channel within the multi-layer substrate. Nor does the global Examiner cite any specific disclosure in the '397 citation which could meet this requirement of claim 1 and its dependent claims. In this regard, for example, P11-P15 are shown merely schematically in FIG. 11 of the '397 citation. The corresponding discussion in the specification (page 14, line 24 to page

15, line 8) indicates that valve and pump mechanisms engage interfaces on the cartridge rather than being mounted to the cartridge.

Other discussion in the '397 citation regarding valves, pumps etc. (e.g. at page 3, middle paragraphs) do not expressly teach that any such components are "mounted aboard the multi-layer laminated substrate in communication with the microscale fluid flow channel" as called for in claim 1 of the present application. For this additional reason, the rejection is without merit and should be withdrawn.

With respect to claim 13 and claims dependent therefrom, the '397 citation fails as an anticipatory citation because it fails to disclose a microfluidic substrate assembly comprising a generally planar multi-layer laminated substrate defining at least one fluid inlet port and at least one microscale fluid flow channel at each of more than one level within the multi-layer laminated substrate for transport of fluid, and at least one microchannel via extending between levels within the multi-layer laminated substrate for fluid communication between microscale fluid flow channels of different levels. Accordingly, the rejection of claim 13 and claims dependent from claim 13 is in error and should be withdrawn. While vias are mentioned in '397 (see, e.g., page 4, line 26) there is no express disclosure of vias extending between levels within a multi-layer laminated substrate for fluid communication between microscale fluid flow channel of different levels.

Regarding independent claim 27 and claims dependent from claim 27, the '397 citation fails as an anticipatory citation because it does not disclose a microfluidic assembly comprising a multi-layer laminated substrate defining at least one fluid inlet port and at least one microscale fluid flow channel within the multi-layer substrate in fluid communication with the inlet port for transport of fluid, wherein at least first and second layers of the multi-layer laminated substrate are selectively welded to each other to form a fluid-tight seal at least along a channel within the multi-layer laminated

substrate. Accordingly, the rejection of claim 27 and claims dependent from claim 27 is in error and should be withdrawn.

In particular, in addition to other shortcomings of the '397 citation, it fails to expressly teach a microfluidic substrate assembly wherein first and second layers of the multi-layer laminated substrate are selectively welded to each other to form a fluid-tight seal at least along a channel within the multi-layer laminated substrate. While the '397 citation discloses various alternative construction techniques (see e.g., page 18, bottom paragraph) no express disclosure is seen in the '397 citation of layers of a multi-layer laminated substrate being selectively welded to each other to form a fluid-tight seal at least along a channel within the multi-layer laminated substrate. Accordingly, the rejection is in error and should be withdrawn.

With respect to independent claim 31 and dependent claims 32-35, the '397 citation fails as an anticipatory citation because it fails to disclose a method of producing a multi-layer laminated substrate, comprising the steps of forming a surface-to-surface interface by aligning a surface of a first substrate component against a surface of a second substrate component to form a substrate sub-assembly having an internal fluid channel at the interface; and exposing the sub-assembly to radiation to heat only one or more selected portions of the interface to a temperature sufficient to weld the substrate components together, to form a fluid-tight seal between the substrate components at the interface along the fluid channel. Accordingly, the rejection is in error and should be withdrawn.

In particular, in addition to other deficiencies, the '397 citation fails to teach a method of producing a multi-layer laminated substrate wherein only selected portions of a surface-to-surface interface are heated to a temperature sufficient to weld the substrate components together to form a fluid-tight seal between the substrate components at an interface along a fluid channel. Accordingly, the rejection should be withdrawn.

Claims 1-6, 8-19 and 27-35 are Patentable over Dubrow et al.

Claims 1-6, 8-19 and 27-35 are rejected under 35 U.S.C. 102(e) over Dubrow. The rejection is respectfully traverse.

Regarding independent claim 1 and claims dependent from claim 1, Dubrow et al. is deficient and that it fails to disclose a microfluidic substrate assembly comprising a multi-layer laminated substrate defining at least one fluid inlet port and at least one microscale fluid flow channel within the multi-layer substrate in fluid communication with the inlet port for transport of fluid; and at least one operative component mounted aboard the multi-layer laminated substrate in communication with the microscale fluid flow channel. Accordingly, the rejection of claim 1 and of claims dependent from claim 1 is in error and should be withdrawn.

In particular, in addition to other deficiencies, Dubrow et al. fails to disclose a microfluidic substrate assembly having at least one operative component mounted aboard a mult-layer laminated substrate in communication with a microscale fluid flow channel within the multi-layer substrate. The devices of Dubrow et al. are said to be used typically in conjunction with an overall analytical system (see, e.g., column 15, line 26 *et seq.*). There is no express disclosure in Dubrow et al. of operative components mounted aboard any such device. Accordingly, again, the rejection is in error and should be withdrawn.

Regarding independent claim 13 and claims dependent therefrom, Dubrow et al. fails as an anticipatory citation because it does not disclose a microfluidic substrate assembly comprising a generally planar multi-layer laminated substrate defining at least one fluid inlet port and at least one microscale fluid flow channel at each of more than one level within the multi-layer laminated substrate for transport of fluid, and at least one microchannel via extending between levels within the multi-layer laminated

substrate for fluid communication between microscale fluid flow channels of different levels. Accordingly, the rejection is in error and should be withdrawn.

In particular, in addition to other deficiencies, Dubrow et al. fails to disclose a microfluidic substrate assembly defining at least one microchannel via extending between levels within a multi-layer laminated substrate for fluid communication between microscale fluid flow channels of different levels. Accordingly, again, the rejection is in error and should be withdrawn.

Regarding independent claim 27 and claims dependent therefrom, Dubrow et al. fails as an anticipatory citation because it fails to disclose a microfluidic substrate assembly comprising a multi-layer laminated substrate defining at least one fluid inlet port and at least one microscale fluid flow channel within the multi-layer substrate in fluid communication with the inlet port for transport of fluid, wherein at least first and second layers of the multi-layer laminated substrate are selectively welded to each other to form a fluid-tight seal at least along a channel within the multi-layer laminated substrate. Accordingly, the rejection is in error and should be withdrawn.

In particular, in addition to other deficiencies, Dubrow et al. does not disclose a microfluidic substrate assembly wherein at least first and second layers of a multi-layer laminated substrate are selectively welded to each other to form a fluid-tight seal at least along a channel within the multi-layer laminated substrate.

Similarly, regarding independent claim 31 and dependent claim 32-35, Dubrow et al. does not disclose a method of producing a multi-layer laminated substrate comprising the steps of forming a surface-to-surface interface by aligning a surface of a first substrate component against a surface of a second substrate component to form a substrate sub-assembly having an internal fluid channel at the interface and exposing the sub-assembly to radiation to heat only one or more selected portions of the interface to a temperature sufficient to weld the substrate components together, to form a fluid-tight seal between

the substrate components at the interface along the fluid channel. Accordingly, the rejection is in error and should be withdrawn.

Claims 7 is Patentable over Dubrow et al. and the '397 Citation in View of Mastrangelo et al.

Claim 7 is rejected under Section 103(a) over WO 99/60397 or Dubrow et al. in view of Mastrangelo et al. The rejection is respectfully traversed.

The Examiner acknowledges that the '397 citation and Dubrow et al. each is silent as to the thermal actuator called out in claim 7. Mastrangelo et al. is cited as teaching thermal actuators as a means to convert electrical energy to mechanical energy. Further, the Examiner asserts that such devices of Mastrangelo are well adapted to service pumps and it would have been in the skill of the art to modify the '397 citation of Dubrow et al. to use a thermal actuator. The rejection fails, however, for lack of motivation for altering the devices of the '397 citation or Dubrow et al. to incorporate a thermal actuator of Mastrangelo et al. As noted above, the '397 citation fails to disclose a microfluidic substrate assembly having an operative component mounted aboard a multi-layer laminated substrate in communication with a microscale fluid flow channel within the multi-layer substrate. Nor is their any need for one identified in the '397 citation or Mastrangelo et al. Accordingly, those skilled in the art would have no reason to add a thermal actuator from Mastrangelo et al. to the '397 device. Similarly, there is no motivation to add a thermal actuator from Mastrangelo et al. to the Dubrow et al. device. Nor is any identified by the Examiner. Accordingly, the rejection is in error and should be withdrawn. Furthermore, Mastrangelo et al. fails to cure the deficiencies noted above in the '397 citation and in Dubrow et al. For this additional reason, the rejection of claim 7 should be withdrawn.

Claims 20-26 are Patentable over the '397 Citation and Dubrow et al.

Claims 20-26 are rejected under 103(a) over WO 99/60397 or Dubrow et al. The rejection is respectfully traversed.

The Examiner acknowledges that the '397 citation and Dubrow et al. each is silent with respect to the PEEK polymer called for in the subject claims. Nevertheless, the Examiner asserts that PEEK is known to be inexpensive and easy to work and, further asserts, therefore, that it would have been within the skill of the art to modify the '397 citation or Dubrow et al. to use a PEEK polymer. In addition to the deficiency of these citations with respect their lack of teaching of PEEK, each also is deficient for the additional reasons discussed above. Accordingly, the subject claims are patentable and the rejection should be withdrawn.

CONCLUSION

In view of the foregoing remarks, claims 1-35 are in condition for allowance, which action is earnestly requested.

Respectfully submitted,
Strand et al.

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Peter D. McDermott (Reg. No. 29,411)
Attorney for Applicants
Banner & Witcoff, LTD.
28 State St. - 28th Floor
Boston, MA 02109
617.720.9600